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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,896	10/05/2001	Hidetoshi Yano	04476.00006	1279

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EXAMINER

LEURIG, CHARLENE L

ART UNIT	PAPER NUMBER
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2879

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/869,896

Applicant(s)

YANO ET AL.

Examiner

Sharlene Leurig

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 05 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 10-15, 17 and 20 is/are allowed.
- 6) ☐ Claim(s) 1-9, 16, 18, 19 and 21 is/are rejected.
- 7) ☐ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 10/5/01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Examiner's Notes

The following typographical errors occur in the claims:

- Claim 1, line 8 should read "linear conductor";
- Claim 3, line 3 should read "together";
- Claim 5, line 17 should read "smaller";
- Claim 10, line 8 should read "penetrating" and line 15 should read "the entire length";
- Claim 12, line 4 should read "as it departs from" or "as it moves apart from";
- Claim 16, line 13 should read "which enables it to", line 16 should read "contains", and line 18 should read "changes";
- Claim 17, line 14 should read "and";
- Claim 20, line 13 should read "almost its entire length" or "almost the entire length".

Appropriate correction is required.

Claim Objections

1. The claims are objected to because they include reference characters which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so

Art Unit: 2879

as to avoid confusion with other numbers or characters which may appear in the claims.

See MPEP § 608.01(m).

Claim 17 contains reference characters "pH", "PCs", "pV", and "PCd", all of which should be in parentheses.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In both claims the outer electrode shape is described as having a winding pitch that "becomes continuously or stepwisely small" according to or corresponding "to a distance from the inner electrode." However, neither claim specifies whether the winding pitch of the outer electrode increases as it approaches the inner electrode or if it decreases as it approaches the inner electrode. Claims 6-9 are rejected as being dependent on a rejected claim.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 18 is rejected under 35 U.S.C. 102(b) as being anticipated by Odagaki (JP 10-112290) (of record). Odagaki discloses a discharge lamp comprising a slender and translucent tube (Figure 1, element 1) having sealing portions formed at both ends (11) and filled with a discharge medium (paragraph 008, line 8), an inner electrode arranged at one end of the translucent tube and given with an electric potential (3), an outer electrode (5) composed of a linear conductor spirally wound around the translucent tube between both ends along an axis of the translucent tube at a prescribed pitch and given with another potential (paragraph 0012, line 3). The outer electrode disclosed by Odagaki is designed so as to satisfy the formula:

$$w \times n \leq 0.3$$

where w is the width of the linear conductor forming the outer electrode and n is the average number of turns of windings per unit length in the axial direction of the translucent tube. Odagaki discloses an outer electrode formed from a wire with a diameter of 0.4 mm (paragraph 0010, line 7) and a tube with a length of 132 mm (paragraph 0009, line 1). Figure 1 shows a lamp with an outer electrode of 18 turns, which when combined with the length of the lamp, yields an n value of 1.36 turns/cm. The product of w and n is therefore .054, which is less than 0.3.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 2879

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Odagaki (JP 10-112290) (of record) in view of Adams (5,965,093). Odagaki discloses a lamp comprising a glass tube (Figure 1, element 1) with both ends sealed airtight (11) and a discharge medium filled in the inside (paragraph 008, line 8), an inner electrode arranged at one end of the glass tube which is given with one electric potential (3), and an outer electrode (5) composed of a linear conductor spirally wound around the glass tube between its both ends at a prescribed pitch along an axis of the tube and is given with another electric potential (paragraph 0012, line 3), wherein the outer electrode is so designed as to satisfy the formula: $w \times n \leq 0.3$ where w (cm) is a width of the conductor comprising the outer electrode and n (turns/cm) is the average number of turns of the conductor in the unit length in the axial direction of the glass tube.

Regarding claim 2, Odagaki discloses a xenon filling (paragraph 0008, line 8). Regarding claim 4, Odagaki discloses the use of Sus304 type steel (paragraph 0010, line 8), which the CRC Handbook of Chemistry and Physics from 1995-6 lists as having a specific resistance of $72 \mu\Omega\text{cm}$, which is less than $2 \times 10^{-4} \Omega\text{cm}$. Odagaki lacks a fluorescent layer formed on the inner wall of the glass tube but discloses the usefulness of the lamp as a germicidal instrument. Adams (5,965,093) teaches a fluorescent layer formed on the inner wall of the glass tube in order to generate higher levels of ultraviolet radiation to more effectively kill bacteria and other germs. Therefore it would have been

Art Unit: 2879

obvious to one of ordinary skill in the art to modify Odagaki's lamp with a fluorescent layer on the inner wall of the tube in order to provide a more effective germicidal lamp.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Odagaki (JP 10-112290) (of record) in view of Adams (5,965,093) as applied to claims 1, 2 and 4 above, and further in view of Gellert (JP 05-174792) (of record). Odagaki discloses a lamp with the limitations discussed above but lacks a fluorescent layer on the inside of the tube. Adams teaches the coating of a fluorescent layer but lacks a resin layer coating the external electrode. However, Odagaki discloses the need for a long lifetime by protecting the electrode from degradation (paragraph 0003, line 3). Gellert teaches the use of a translucent resin (paragraph 0027, line 5) in order to protect the external electrode (paragraph 0007, line 2) to ensure a long lifetime (paragraph 0005, line 6). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Odagaki's lamp with a fluorescent layer in order to create a more efficient germicidal lamp and to modify it further with a resin layer coating the external electrode in order to ensure a long lifetime.

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Odagaki (JP 10-112290) (of record) in view of Adams (5,965,093) as applied to claims 1, 2 and 4 above, and further in view of Yokogawa (JP 10-284008) (of record). Odagaki discloses a discharge lamp comprising a long and slender translucent airtight container (Figure 1, element 1), a discharging medium primarily composed of a rare gas filled in the translucent airtight container (paragraph 008, line 8), and an outer electrode composed of a conductive coil (5) which is substantially in contact with an outer surface of the

Art Unit: 2879

translucent airtight container extending along its longitudinal direction apart from the inner electrode and which enables it to generate discharge in the translucent container between the outer electrode and the inner electrode. Odagaki lacks a phosphor film formed on an inner surface of the translucent container but discloses the usefulness of the lamp as a germicidal instrument. Adams (5,965,093) teaches a fluorescent layer formed on the inner wall of the glass tube in order to generate higher levels of ultraviolet radiation to more effectively kill bacteria and other germs. Therefore it would have been obvious to one of ordinary skill in the art to modify Odagaki's lamp with a fluorescent layer on the inner wall of the tube in order to provide a more effective germicidal lamp.

Odagaki further lacks an outer electrode containing at least one point of inflection where the winding pitch of the coil changes from a small value to a large value. However, Odagaki discloses the need for a properly wound electrode that produces sufficient luminous intensity (paragraph 0010, line 11). Yokogawa teaches the formation of an external electrode whose gaps change in width in the axial direction in order to vary luminous intensity (paragraph 0022, line 8). As shown in Figure 10a, one such external electrode shape can be in the form of an electrode with a point of inflection where the pitch changes from a small to a large value. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Odagaki's lamp with an external electrode where the winding pitch has a point of inflection in order to vary the luminous intensity to attain the desired germicidal effect.

7. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tyler (5,747,946) in view of Odagaki (JP 10-112290) (of record). Tyler discloses a discharge

Art Unit: 2879

lamp comprising a glass tube (Figure 3, element 1) with both ends sealed airtight and a discharge medium filled in the inside (column 2, line 59), a fluorescent layer formed on the inner wall of the glass tube (column 2, line 59), an inner electrode arranged at one end of the glass tube which is given with one electric potential (10), and an outer electrode (15) composed of a linear conductor spirally wound around the glass tube between its both ends at a prescribed pitch along an axis of the tube and is given with another electric potential (column 2, line 67). Tyler discloses the use of the lamp in a liquid crystal display (column 2, line 64), the lamp having a main body and a lighting circuit to turn on the fluorescent lamp (column 2, line 66). However, Tyler lacks a specific description of the winding of the outer electrode. Tyler does disclose the option of changing the pitch to achieve the desired luminous efficiency of the lamp (column 4, line 58). Odagaki teaches an outer electrode that is so designed as to satisfy the formula: $w \times n \leq 0.3$ where w (cm) is a width of the conductor comprising the outer electrode and n (turns/cm) is the average number of turns of the conductor in the unit length in the axial direction of the glass tube. Odagaki discloses an outer electrode formed from a wire with a diameter of 0.4 mm (paragraph 0010, line 7) and a tube with a length of 132 mm (paragraph 0009, line 1). Figure 1 shows a lamp with an outer electrode of 18 turns, which when combined with the length of the lamp, yields an n value of 1.36 turns/cm. The product of w and n is therefore .054, which is less than 0.3. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Tyler's lamp with an external electrode satisfying the equation: $w \times n \leq 0.3$ where w (cm) is a width of the conductor comprising the outer electrode and n

Art Unit: 2879

(turns/cm) is the average number of turns of the conductor in the unit length in the axial direction of the glass tube in order to achieve the desired luminous efficiency.

Allowable Subject Matter

Claims 10-15, 17 and 20 are allowed. The claims are found to be allowable because no prior art suggests or shows a lamp having an outer electrode with a tube power increasing means at a portion where a disturbed diffused positive column or a constricted positive column is generated in the tube, or where the winding pitch of the external electrode becomes minimum in a region (pH) facing a pair of constricted positive columns (PCs) generated in lamp and where it becomes maximum at both ends in a region (pV) facing a diffused positive column (PCd) generated in the tube, and decreases stepwisely from both ends toward the central portion.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (703)305-4745. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703)305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

Application/Control Number: 09/869,896


Page 10

Art Unit: 2879

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Sharlene Leurig
January 6, 2003

SL


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